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# Beyond Language: Impacts of Shared Reading on Parenting Stress and Early Parent-Child Relational Health

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## Abstract

This study examined the interrelated and longitudinal impacts of parent-child shared book reading, parenting stress, and early relational health, as measured by both parental warmth and parent sensitivity, from infancy to toddlerhood. To extend findings from previous studies of collateral effects that have been conducted in parenting interventions, we examined parenting behaviors in a broader context to determine whether shared book reading would confer collateral benefits to the parent and parent-child relationship beyond those expected (i.e., language and literacy). It was hypothesized that positive parent-child interactions, such as shared reading, would have positive impacts on parent outcomes such as parenting stress, parental warmth, and sensitivity. The sample consisted of 293 low-income mothers and their children who participated in a randomized controlled trial. Shared book reading, parenting stress, and parental warmth were assessed when children were 6 and 18 months old. We computed a series of cross-lagged structural equation models to examine longitudinal interrelations among these three factors. Results indicated that shared book reading at 6 months was associated with increases in observed and reported parental warmth and observed sensitivity and decreases in parenting stress at 18 months, controlling for baseline risk factors and treatment group status. These findings suggest that early parent-child book reading can have positive collateral impacts on parents' stress and the parent-child relationship over time.

### Keywords

parenting; shared reading; parent-child interaction; parent-child relationship

Research in early childhood highlights the importance of early environments and interactions with trusted caregivers for the development of children's cognitive, language and literacy, and social-emotional skills (Bradley et al., 1989; Rowe, 2012; Dieterich, Assel, Swank, Smith, & Landry, 2006; Cabrera, Karberg, Malin, & Aldoney, 2017). Parent-child

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book sharing is one such interactional activity, and studies have linked such shared reading to numerous benefits for infants (4–18 months), toddlers, and preschool-aged children (2–4 years), including vocabulary and language development (Bojczyk, Davis, & Rana, 2016; Ece Demir-Lira, Applebaum, Goldin-Meadow, & Levine, 2019; Raikes et al., 2006), as well as social competence and attention (Blewitt & Langan, 2016; Drummond, Paul, Waugh, Hammond, & Brownell, 2014; Karrass, Braungart-Rieker, Mullins, & Lefever, 2002). Longer-term positive impacts have also been found on children's social understanding and prosocial behavior at ages 5–6 (Aram, Deitcher, Shoshan, & Ziv, 2017), as well as reading achievement at age 13 (0.8 *SD*; Price & Kalil, 2018).

However, little is known about the potential positive collateral effects that shared book reading may have on the quality of the parent-child relationship and the expression of supportive caregiving behaviors above and beyond language. An emerging body of literature examining the collateral impacts of parenting interventions aimed at preventing or addressing child behavior problems or disparities in child development has shown that such programs affect a variety of factors associated with parental well-being (e.g., Bullard et al., 2010; Lunkenheimer et al., 2008; McEachern, Fosco, Dishion, Shaw, Wilson, & Gardner, 2013), often mediated through their impacts on parenting behaviors. However, such studies have largely focused on improving parenting stress or depression by reducing negative parenting behaviors, such as harsh discipline, rather than by increasing positive parent-child interactions. Further, there have been few studies examining the potential benefits to parents and parent-child relational health of positive parenting behaviors outside of interventions, and such analyses might support broader generalizability of findings. Moreover, parent-child relational health—that is, the quality and patterns of early relationships and interactions between caregivers and children—is increasingly recognized as critical to infant mental health and early social and emotional development (National Scientific Council on the Developing Child, 2004; Rosenblum, Dayton, & Muzik, 2009; Weatherston & Rosenblum, 2018), further emphasizing the importance of such potential benefits. Family systems theory, which posits that changes in one aspect of the family system will have impacts on others based on their interconnected nature, also would support the potential for such collateral and potentially bidirectional effects to exist in everyday parent-child interactions. Thus, with this theoretical framework and the extensive literature on collateral effects of parent-child interventions, the current study sought to extend our knowledge by examining whether shared reading in infancy would have collateral longitudinal effects on parents' stress and parent-child relationship quality in toddlerhood.

## Collateral Effects within a Family Systems Framework

Family systems theory views families as dynamic, self-regulating systems that adapt to changes in the family structure or environment, and that have a hierarchical organization of subsystems (e.g., parent-environment, interparental, parent-child) that are best viewed as a whole, rather than individual parts (Cox & Paley, 2003). Further, family systems theory emphasizes the interactions and often reciprocal influences among multiple subsystems. Accordingly, having a baby would likely lead to changes in the parents' relationship, which in turn would influence interactions between the parent and child and eventually, once again likely influence the parents' relationship (Cowan & Cowan, 2000).

Family systems provides a framework for considering collateral effects of parenting interventions targeting child behavior problems. Similar to the example above, changes in the caregiving subsystem may influence children's behavior and the parental relationship, as well as the parent as individuals within the system. Such effects have been found across a wide variety of interventions. In one study of 110 biological mothers and stepfathers of 5–10 year-old children with behavior problems, researchers found that a parenting intervention had impacts on parents' relationship satisfaction through its effects on improved parenting (Bullard et al., 2010). Similarly, in a sample of 731 low-income families with children between 2 and 3 years old, participation in the Family Check-Up, a preventive parenting intervention for families of toddlers at increased risk for later behavior problems, was associated with lower maternal depression (Shaw et al., 2009), increased parent-parent relationship satisfaction (Weaver et al., 2019), and perceived maternal social support satisfaction (McEachern, Fosco, Dishion, Shaw, Wilson, & Gardner, 2013). In the case of improved maternal social support, effects were mediated through FCU effects on reductions in children's behavior problems (McEachern et al., 2013).

As with interventions designed to help management of behavior problems, research on universal primary preventive interventions have also shown evidence of collateral benefits. For example, Video Interaction Project (VIP), which aims to reduce school readiness disparities for low-income children, found that mothers receiving VIP had lower parenting stress and fewer depressive symptoms, with the latter impact mediated by increases in positive parent-child interactions (Berkule et al., 2014; Cates et al., 2016).

## Parent-Child Book Reading: Predictors and Outcomes

Most studies examining the relation between parent and family characteristics and parent-child interactions have focused on whether family-level assets and risks are associated with parents' engagement in specific activities such as book reading, rather than examining collateral effects of those activities on parental well-being or on early relational health. For instance, studies of parent-child book reading have indicated that more educated mothers and those with higher incomes tend to read more to their children (DeBaryshe, 1995), as do mothers who report less parenting stress and fewer daily parenting hassles (Karrass, VanDeventer, & Braungart-Rieker, 2003). Maternal reading beliefs and goals have also been related to quantity and quality of shared book reading. Meagher, Arnold, Doctoroff, and Baker (2008), for example, found that mothers of 5–6 year-old children who believed that shared reading should involve learning and should be fun exhibited more positive shared reading interactions with their children. Similarly, parents who set high goals for fostering reading with their pre-K aged children also took part in more concurrent engaging shared reading and especially more print-referencing behaviors compared with parents with other goal profiles (Audet, Evans, Williamson, & Reynolds, 2008).

Further, as early literacy emerges in part from relationships involving caregiver-child interactions above and beyond printed materials, positive maternal behaviors in other contexts appear to extend to book reading interactions. In particular, supportive maternal presence, respect for child's autonomy and absence of hostility—as measured by both survey (Dexter & Stacks, 2014) and observations coded from videotaped interactions at

child age 36 months (Clingenpeel & Pianta, 2007)—were strongly positively associated with higher quality shared book reading in first grade, particularly for teaching activities.

Despite these studies of effects of parent characteristics on frequency and quality of shared book reading, few have examined the potential collateral impacts in the other direction—that is, how shared book reading may affect parenting outside of the specific reading interaction. Those studies that have examined aspects of parent-child relational health—namely, attachment security—in relation to shared book reading have found associations between mother-child attachment and both frequency and quality of book reading interactions (e.g., Bus, Belsky, van Ijzendoorn, & Crnic, 1997; Bus & van Ijzendoorn, 1995). However, such studies have been largely cross-sectional, with direction of effect difficult to determine. However, studies of parenting more broadly have indicated that while parent characteristics like maternal depression, marital problems, and parenting stress are linked to internalizing and externalizing behaviors in children, there is evidence for reciprocal influences in those relations (e.g., Fanti, Henrich, Brookmeyer, & Kupermine, 2008; Gross, Shaw, & Moilanen, 2008; Neece, Green, & Baker, 2012; VanderValk, de Goede, Spruijt, & Meeus, 2007). Based on the interconnected and often reciprocal systems within the family, it is likely that contextual factors that influence parenting behaviors do so by influencing parent well-being and functioning (Belsky, 1984; Crnic & Low, 2002). Outside of ancillary impacts of parenting programs on parent outcomes, in addition to the child outcomes targeted by those interventions, few studies have examined the ways in which parenting behaviors and parent-child interactions themselves can influence parents. Two notable studies *have* examined how parent-child shared reading affected parental stress and parenting behaviors. In the first study, in a sample of 116 socioeconomically diverse parent dyads who also varied widely in maternal age and had an infant in the neonatal intensive care unit (NICU), Lariviere and Rennick (2011) examined the effects of a parent book reading intervention on the quality of parent-infant interactions. In addition to finding that intervention group parents reported reading more to their infants than control parents, intervention group parents reported that reading helped them feel closer to their babies, but did not reduce perceived levels of stress. In the second study, Jimenez and colleagues (2019) used data from the Fragile Families and Child Wellbeing Study (FFCWS), a large urban birth cohort born between 1998 and 2000 from 15 sites in the US. Using data from 2,165 mothers who provided data at both child age 3 and 5 years, they examined associations between early shared reading and subsequent harsh parenting. They found that parent-child book reading at child ages 1 and 3 predicted less harsh parenting at ages 3 and 5. Further, the association between shared reading at age 1 and harsh parenting at age 5 was partially mediated by decreased child disruptive behaviors at age 3. These findings suggest that shared reading can confer collateral benefits not just to children, but also to parents and the parent-child relationship.

## The Current Study

Previous research has indicated that collateral effects on marital satisfaction, maternal depression, and parenting stress exist for parenting interventions aimed at improving or preventing child behavior problems or disparities in development. However, while these studies indicate that changes in parenting behaviors may affect parents' own well-being, studies of parent behavior in broader contexts have largely focused on impacts on child

development, or on the ways in which maternal psychosocial characteristics and parenting beliefs affect these behaviors. Based on recent findings indicating impacts of shared reading on maternal feelings of closeness and harsh parenting, this study aimed to extend the literature on collateral effects by examining the potentially interrelated impacts of shared reading on parenting stress and parental warmth and sensitivity from infancy (age 6 months) to early toddlerhood (age 18 months) using a cross-lagged longitudinal design within a larger randomized controlled trial (RCT). Further, based on the ways in which associations with maternal characteristics and parenting behaviors vary between frequency and quality of book reading, we examined each of these aspects of shared reading individually. Finally, to determine the robustness of the cross-lagged findings, we examined group differences between sites, treatment groups (described below), and levels of baseline risk to determine whether the same paths for the overall sample would remain significant. We hypothesized that there would be within- and cross-domain impacts of shared book reading, parenting stress, and parent-child relational health, such that shared book reading in infancy would predict both concurrent and later parenting stress and relational health, and that parenting stress and relational health would predict shared book reading activities.

## Method

This study involved secondary analysis of data from the Smart Beginnings (SB) RCT, taking place in New York, NY (NYC) and in Pittsburgh, PA. Smart Beginnings is a tiered intervention model integrating two evidence-based interventions, utilizing pediatric primary care as a universal point of access for delivery of a primary prevention intervention and screening for all families. Families in the intervention arm with additional psychosocial risks or child behavior problems are also provided with a targeted secondary prevention program in the home. Smart Beginnings aims to enhance the social-emotional and cognitive development of children in low-income families through promotion of responsive parenting and positive parent-child interactions (see Miller et al., 2019 for a thorough description of the Smart Beginnings model). This study was registered in www.clinicaltrials.gov (NCT02459327). IRB approval was obtained for this study, “Integrated model for promoting parenting and early school readiness in pediatrics,” from NYU (FY2016–408), NYU School Medicine (S14–01764) and the University of Pittsburgh (STUDY19040158); additional research approval was obtained from NYC Health+Hospitals (TX00001044). The current observational study focused on relations between parent-child shared book reading and parental warmth and parenting stress across all participants, controlling for treatment group (intervention vs. control).

### Participants

Mothers and infants were enrolled in the RCT of Smart Beginnings in the postpartum units of large urban hospitals in NYC between June 2015 and February 2017 and in Pittsburgh between June 2016 and October 2017 ($N = 403$). Inclusion criteria were full-term, singleton, non-low birthweight births with no significant prenatal or perinatal medical conditions, no eligibility for Early Intervention at birth (e.g., Down Syndrome), and plans to receive pediatric care at the institution. Mothers were invited to participate if they were the primary caregiver, had no prior participation in the interventions, had no known impairment that

would be a barrier to communication and participation (e.g., intellectual disability or schizophrenia), and spoke either English or Spanish.

Descriptive statistics of the sample are listed in Table 1. The sample at both sites was primarily composed of low-income mothers, with about a third primiparous (first-time birth). There were, however, several site-specific differences. The majority of mothers in NYC were Latinx (84%), whereas in Pittsburgh they were predominantly African-American (81%). Mothers across sites also differed in terms of their sociodemographic risks. Parents in NYC were more likely to be married or cohabiting than those in Pittsburgh (81% vs. 40%). Mothers in Pittsburgh, on the other hand, were more likely to be high school graduates than mothers in NYC (84% vs. 56%).

## Procedure

Mothers completed baseline assessments at recruitment within the first six weeks of the child's life. Follow-up assessments took place at infant age 6 and 18 months. At each assessment, mothers were interviewed about their family and life circumstances, parenting stress, their interactions with their child, and their feelings of warmth, control, and self-efficacy as parents. Mothers and children were also observed in free play and clean-up activities, as well as in three teaching tasks, and children were observed during independent play. Six month assessments were primarily conducted in the lab, and 18 month assessments were primarily conducted in the home. At 6 months, around 9% of the sample in NYC and 12% of the sample in Pittsburgh was lost to attrition, respectively. Overall, there were no differences between attrited and non-attrited groups at either site at 6 months. At 18 months, around 20% of the sample at each site was lost to attrition. Whereas in Pittsburgh there were no differences between attrited and non-attrited groups, there was a marginal trend in NYC for attriters to be less likely to be Latinx compared with non-attriters.

For the present analyses, we tested relations between parent-reported shared book reading and parental warmth (observed and reported) and parenting stress (reported) at both time points. Cross-lagged analyses allowed us to evaluate whether shared book reading was associated with early relational health, including warmth/sensitivity, or feelings of parenting stress; whether parenting and parent well-being was related to later parent-child book reading interactions; or whether bidirectional relations were evident.

## Measures

**Shared Book Reading.—**Parent-child reading activities in the home were measured via maternal interview using the READ subscale of the StimQ Cognitive Home Environment (StimQ; Mendelsohn et al., 2011). The StimQ is a standardized interview measure of caregiver cognitive stimulation and includes scales assessing Parent Verbal Responsivity (PVR), Parental Involvement in Developmental Advance (i.e., teaching activities; PIDA), Availability of Learning Materials (ALM) and Reading Activities (READ). The READ scale includes questions regarding the frequency of caregiver-child book sharing and book sharing routines; reading diversity, including types of books read; and questions about book sharing interactions, such as whether the caregiver asks questions, points to and labels pictures, or talks about the feelings/emotions of characters.

The StimQ was developed for use in English and Spanish, and has been validated for use with low-income populations. To ensure accuracy and limit social desirability bias, interview questions include prompts for descriptions/examples and follow-up questions. The StimQ has been shown to have high concurrent validity with the HOME Inventory and high internal consistency, with Cronbach's alpha ranging from .88 to .93 (Dreyer, Mendelsohn, & Tamis-LeMonda, 1996; Mendelsohn, et al., 2011). Three versions of the StimQ have been developed and validated: StimQ Infant, StimQ Toddler, and StimQ Preschool. The StimQ has been used in nearly 100 studies in the U.S. and internationally, both as an outcome and as a predictor of language, cognitive, and fine motor skill development. (More information on the StimQ can be found at https://med.nyu.edu/pediatrics/developmental/research/belle-project/stimq-cognitive-home-environment). For the present analysis, overall StimQ READ scores (range 0–13) were used. Additional analyses were performed for the StimQ Quantity and StimQ Quality subscales to examine nuances within the data.

### Early Relational Health.

**Parental Warmth.:** Parental warmth and feelings of enjoyment in interacting with and parenting their children were examined through maternal interview using the Supporting and Enjoying subscale of the Parenting Your Baby questionnaire. This 8-item subscale asks parents about their parenting activities and feelings in the past month, including items like "play with your child in a way that was fun for him/her" and "feel confident in reading your child's cues." Items are rated on a seven point scale from 1 (*Not at all*) to 7 (*Most of the time*). This scale has shown high construct, convergent, and predictive validity in children at school entry (McEachern et al., 2012) and has been used extensively with toddlers and young children. In the current sample, Cronbach's alpha ranged from .67 to .73.

**Parental Sensitivity.:** Parental sensitivity was examined through observational coding of parent-child interactions during a 10-minute videotaped free-play task based on the Parent-Child Interaction Rating Scales-Infant Adaptation (PCIRS-IA). The PCIRS-IA is an observational scale adapted from three separate scales to assess the quality of the primary caregiver's parenting behaviors and their interactions with the target child: The Parent-Child Early Relational Assessment (P-CERA; Clark, 1999), the Mother-Child Interaction Rating Scale (MCIRS; Winslow & Shaw, 1995), and the Caregiver-Child Affect, Responsiveness, and Engagement Scales (C-Cares; Tamis-LeMonda, Rodriguez, Ahuja, Shannon & Hannibal, 2002). Coders were blind to random assignment status and all other information about the mother and infant. Observed sensitivity was scored on a scale from 1 *(Very low)*, meaning the mother did not demonstrate the described behavior, to 7 *(Very high)* meaning the mother characteristically demonstrated the described behavior. The average weighted reliability kappa for these ratings ranged from .7–.85, indicating a high degree of agreement between coders.

**Parenting Stress.—**The Parent-Child Dysfunctional Interaction subscale of the short form of the Parenting Stress Index (PSI; Abidin, 1990) was used to measure parenting stress. This scale asks parents about their attitudes and behaviors when interacting with their child, and measures the extent to which parents perceive interactions with their child as rewarding and their child as meeting expectations. Sample items include "My child rarely does things

for me that make me feel good" and "Most times I feel that my child does not like me and does not want to be close to me" and are rated from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The PSI has been validated in low-income samples, and has demonstrated excellent internal consistency (Cronbach's $\alpha$ = .88–.95) and construct validity. Regression analyses have shown significant associations between the Dysfunctional Parent-Child Interaction scale and maternal self-reported psychological symptoms, as well as family income ($R^2$ = .21; Reitman, Currier, & Stickle, 2002). In the current study, a categorical variable was used indicating whether parents scored at or above the 60$^{th}$ percentile at-risk cutoff or not.

### Covariates.

**Treatment Group.:** All statistical models controlled for group assignment to the intervention or control group in the Smart Beginnings RCT, which was scored dichotomously as 0 (*control*) or 1 (*intervention*).

**Baseline Risk.:** Using measures from the baseline survey, we created a multidimensional accumulation of risk index comprised of 15 child, maternal, and household exogenous pre-random assignment variables. The included variables were: target child (TC) gender, maternal race/ethnicity, maternal grade equivalent score on the Woodcock Johnson III Letter-Word Identification subtest (Woodcock, McGrew, & Mather, 2001), a dichotomous indicator for any maternal drug use during pregnancy, trimester start of prenatal health care, whether the mother was married at TC's birth, whether the mother was teenaged at TC's birth, a dichotomous indicator of report of partner violence in the home, household receipt of Temporary Assistance to Needy Families (TANF), household income-to-needs ratio, a dichotomous indicator of household food insecurity, a dichotomous indicator of household financial instability, and number of children in the home. In addition, maternal scores on the General Life Satisfaction scale (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983) and household scores on the Confusion, Hubbub, and Order (CHAOS) scale (Matheny, Wachs, Ludwig, & Phillips, 1995) were also included to account for other stressors in the family's context.

## Analysis

A cross-lagged structural equation panel model (SEM) was utilized in the present analysis using Stata 14 (StataCorp, College Station, TX) to examine relations between early parent-child relational health, represented by parental warmth (parent report) and parental sensitivity (observed), and parent-child book reading. Additionally, a generalized SEM (gsem) using logit regressions was used to predict outcomes related to parenting stress, based on the binary nature of this outcome. Cross-lagged models allow for both the analysis of stability of each variable over time and crossed influences of time 1 measurements on time 2 measurements. Each series tested four potential models: 1) a baseline model with only stability paths, 2) a model with stability paths and cross-lagged paths indicating book reading predicting early relational health variables or parenting stress, 3) a model with stability paths and cross-lagged paths indicating early relational health or parenting stress predicting later book reading, and 4) a fully cross-lagged model. All models controlled for treatment group and level of baseline risk, and included correlations between the error terms of book reading and either parental warmth or parenting stress at each time point. For the

gsem models including parenting stress, adjusted odds ratios calculated as $e^{\beta}$, rather than confidence intervals, are reported along with coefficients (β) for the binary outcomes.

## Results

### Descriptive Statistics

Caregivers, on average, reported moderate levels of reading and high levels of warmth at both 6 and 18 months. Average observed sensitivity remained relatively stable across both time points. Further, although few differences were found across sites, caregivers in Pittsburgh reported significantly higher warmth at both 6 and 18 months, and significantly more parents in NYC scored in the at-risk range on the PSI at 18 months (Table 1). In addition, there were significant correlations between several variables (Table 2). In particular, reading at both 6 and 18 months was associated with concurrent, and for 6 month reading scores, subsequent parental warmth and stress.

### Model Fit

Model fit indices for each of the four models predicting early relational health are found in Table 3. Both model 2 and the fully cross-lagged model (model 4) had acceptable goodness of fit, with RMSEA < .05, and were a better fit than the baseline model. Although there was not a significant change in fit from Model 2 to Model 4, the fully cross-lagged model was used in subsequent analyses based on its slightly better fit.

Only relative model fit indices (Akaike's Information Criteria [AIC] and Bayesian Information Criteria [BIC]) are available for models using binomial logit regression within SEM. These indicated that the fully cross-lagged model (model 4) provided the best fit to the data examining parent-child book reading and parenting stress (Table 4).

### Parent-Child Book Reading and Early Relational Health

Parent-child book reading in infancy, but not relational health, was associated with parent-child book reading at 18 months, after adjusting for treatment group and baseline risk. Parent-child book reading in infancy was additionally associated with relational health in early toddlerhood. Specifically, book reading at 6 months and both observed sensitivity and parent-reported warmth at 6 months were related to observed sensitivity at 18 months. Additionally, warmth and book reading at 6 months were related to parent-reported warmth at 18 months (Figure 1).

### Parent-Child Book Reading and Parenting Stress

The analyses performed for parental warmth were repeated for parenting stress (Figure 2). Only 6 month reading activities predicted 18 month reading activities, but both parenting stress and shared reading at 6 months were associated with parenting stress at 18 months, albeit in opposite directions.

### Quality of Book Reading Interactions and Relational Health and Parenting Stress

When specifically examining reading quality, the pathways seen in the overall reading scale were supported in a more limited way. When examining cross-lagged relations with early

relational health, the fully cross-lagged model showed adequate fit (RMSEA = .054, CFI = .99). In this model, only reading quality at 6 months was associated with reading quality at 18 months, $b = .33$, $p < .05$. Relational health and importantly, book reading, at 6 months were associated with relational health at 18 months. This pattern was particularly true for parent-reported warmth, $b = .14$, $p < .01$, but did not reach statistical significance in associations with observed sensitivity, $b = .09$, $p = .12$. Cross-lagged models examining the relation between the quality of book reading interactions and parenting stress indicated that reading quality at 6 months was associated with the likelihood of parents meeting the at-risk cutoff for parenting stress at 18 months, $b = -.32$, $p < .05$. Again, as in our previous models, only earlier reading quality was associated with reading quality at 18 months.

### Frequency of Book Reading Interactions and Relational Health and Parenting Stress

When examining the relations between reading frequency or quantity and early relational health, again, the model showed adequate fit (RMSEA = .08, CFI = .97). This model replicated the overall reading model, with reading quantity at 6 months associated both with observed sensitivity, $b = .11$, $p < .05$, and parent-reported warmth, $b = .16$, $p < .001$, at 18 months. Interestingly, however, in the binomial model, reading quantity at 6 months was not associated with parents' meeting the at-risk cutoff score for parenting stress at 18 months, $b = -.23$, $p = .13$.

### Robustness Checks

To test the robustness of the cross-lagged relations between book reading and early relational health, we looked at group analyses across study site, intervention group, and high vs. low baseline risk, based on a median split of risk scores. First, log likelihood tests were used to compare models in which all paths were constrained to be equal across groups versus models with parameters freely estimated across groups. If the model in which all paths were constrained was a worse fit, differences in pathways between the groups were examined.

When comparing models across sites, the constrained model was a significantly worse fit than the freely estimated model, $\chi^2\Delta\ (36) = 100.25$, $p < .001$, suggesting that path estimates differed between families at each site. Three pathways of the 15 in the fully cross-lagged model were found to differ between sites: the pathway from 6-month parent-reported warmth to 18- month reading, the pathway from 6 month reading to 18-month observed sensitivity, and the pathway from 6 month parent-reported warmth to 18-month observed sensitivity. The relation between 6-month parent-reported warmth and 18-month reading was significant for families in Pittsburgh, $b = 1.38$, $p < .01$. On the other hand, reading and parent-reported warmth at 6 months predicted 18-month observed sensitivity only in New York, $b = .06$ and .34, respectively, $p < .05$.

Similarly, when comparing models across intervention and control groups, the constrained model was a significantly worse fit than the freely estimated model, $\chi^2\Delta\ (36) = 50.24$, $p < .05$. Four of the 15 pathways in the full cross-lagged model differed between these groups. The pathway between 6-month reading and 18-month observed sensitivity was only significant in the control group, $b = .05$, $p < .05$, along with the covariance between reading and parent-reported warmth at both 6 and 18 months, $b = .40$ and .42 respectively, $p < .05$,

and between parent-reported warmth and observed sensitivity at 6 months, $b = .12$, $p < .05$. On the other hand, the path between 6-month parent-reported warmth and 18 month observed sensitivity approached significance, but only in the treatment group, $b = .44$, $p = .06$.

There was no significant difference between the fully constrained model of cross-lagged relations between book reading and early relational health and the freely estimated model when comparing across high and low risk families, $\chi^2\Delta$ (36) = 48.25, p = .08, indicating that relational pathways did not differ between these groups.

## Discussion

A significant body of research has indicated that parent-child shared book reading has important benefits for children's linguistic, cognitive, and social-emotional development. However, few studies have examined whether positive parent-child interactions, such as shared book reading, could have collateral benefits for parents. In line with family systems theory, the current findings indicate that increased shared book reading in infancy was associated with improved parent outcomes in toddlerhood, both through reductions in parenting stress and increases in early relational health. These results extend previous research suggesting that reading in the NICU helps parents bond with their premature infants (Lariviere & Rennick, 2011) and that early shared reading is associated with less harsh parenting (Jimenez et al., 2019).

In a cross-lagged panel model, we found that shared book reading at infant age 6 months positively predicted early relational health, both in parent reported warmth *and* observed parental sensitivity, even when adjusting for baseline risk and intervention impacts. These findings were also present, for the most part, when looking specifically within the book reading subscales of both reading quality and quantity, indicating the act of reading more broadly has collateral benefits for parents. Similarly, shared book reading at 6 months predicted a lower likelihood of clinically at-risk levels of parenting stress at 18 months, independent of the impacts of baseline risk, intervention, or previous parenting stress. Contrary to study hypotheses, the reverse relation was not found for the overall sample; that is, relational health and parenting stress at 6 months did not predict the amount of shared book reading that parents and children engaged in at 18 months, as has been found in other prior work. This relation was found in the Pittsburgh sample alone, however, indicating that the lack of reciprocal findings in the sample overall may be because of differences between sites in reported parental warmth and stress, particularly at 6 months. This difference may be the result of specific site-related stressors, such as those related to immigration, that were much more pronounced in the NYC sample (Barajas-Gonzalez, Avon, & Torres, 2018). In addition, in the NYC sample, cross-lagged paths between reading and parent-reported warmth remained significant, but only the stability path for observed sensitivity from 6 to 18 months was significant. There was a similar difference when comparing intervention and control groups, indicating that 6-month reading only predicted observed sensitivity at 18 months in the control group, perhaps because the Smart Beginnings intervention itself focused so much on responsive and sensitive parenting interactions. Still, taken together, the

robustness checks performed indicate that the overall pathways from shared reading in infancy to relational health in early toddlerhood are stable.

These results have important clinical implications and support the development and dissemination of interventions that promote positive parent-child interactions not only because of their impacts on children's development, but also because of their potential impact on parent and family well-being. The current findings provide evidence that such interventions, even when considered one-generation models, may in fact have two-generation impacts, providing benefits to both parents and children—and potentially other family members— by influencing early relational health. Several potential aspects of shared book reading interactions might promote the parent-child relationship. These include physical proximity, as parents often hold their children while reading, especially in infancy; mutual enjoyment or peacefulness, especially if shared reading takes place as part of a quiet routine, such as before bed; or alleviated pressure on the parent as an active participant, as the book can act as a prop and prompt for parent-child conversation and interaction. Moreover, as indicated in Jimenez and colleagues' previous work, as well as studies of collateral benefits of interventions (e.g., Weisleder et al., 2019), shared reading activities may be associated with less difficult behavior in children – or may reduce parent perceptions of disruptive behavior. This, in turn, could have benefits for parents' stress, and lead to more frequent reading interactions, creating a positive early environment for both the parent and child and facilitating children's development. The current findings also further reinforce that such development, including the emergence of early literacy, occurs in part from a relational system involving caregiver-child interactions indirectly involving reading the print on the page (Clingenpeel & Pianta, 2007), and that these broader interactions might have collateral impacts on parents and on parent-child relational health in addition to their direct effects for children. Future studies specifically examining print-based and non-print-based aspects of reading interactions, as well as impacts of other types of parent-child interactions on parental stress and behaviors, will further our understanding of the mechanisms behind these ancillary effects and enable more targeted interventions and parental guidance.

Although a large and diverse sample of low-income families was included in this study, the samples between each site varied on a number of important confounding characteristics, including race and ethnicity, single parenthood, and, of course, metropolitan area. Robustness analyses examining differences in cross-lagged effects across sites attempted to address these differences, and the fact that our main findings held in both samples has important implications for the potential benefits of shared reading across cultures and contexts. Future research should examine the specific characteristics of these populations that may lead to the few differential impacts of book reading—and potentially other positive parent-child interactions—on early relational health that were found in the current study.

This study had a few limitations. Although there were significant impacts of shared book reading on relational health and parenting stress, the effect sizes were relatively small. Still, these effects may have clinical significance and provide the motivation for future studies, especially for parenting stress, as a 1-point increase in the parent-child reading score reduced the odds of meeting the clinically at-risk cutoff for parenting stress by 10%. Additionally, although our assessments of parenting warmth and sensitivity were bolstered

by the inclusion of both parent survey and observational data, the observational activities were not strictly designed to elicit parental sensitivity. Nevertheless, the observations of play used in the current analysis may be a more ecologically valid measure of parental sensitivity, as they are more likely to be activities that parents engage in with their child outside of the laboratory. Finally, although the current study was able to examine shared book reading and parenting longitudinally, we cannot fully determine causality in the relation between these factors, based on the observational nature of this analysis.

In conclusion, the present findings suggest that shared book reading has important positive impacts for parents and children and extends our understanding of the collateral impacts of parent-child interactions. Early parenting interventions, particularly those that target at-risk populations who face external stressors that can impact parenting, should focus on promoting positive parent-child interactions such as shared reading as a way to improve parenting behaviors and attitudes toward their children. Parenting stress and the quality of parent-child relationships—including parental warmth and sensitivity—are substantial factors not only for parental well-being, but also for healthy child development. These family factors are particularly relevant for children's socioemotional development, including emotion regulation and prosocial behavior (e.g., Jennings et al., 2008; Newton, Laible, Carlo, Steele, & McGinley, 2014). Thus, such interactions may improve children's outcomes beyond the impacts of language-rich and cognitively-stimulating interactions on their own.

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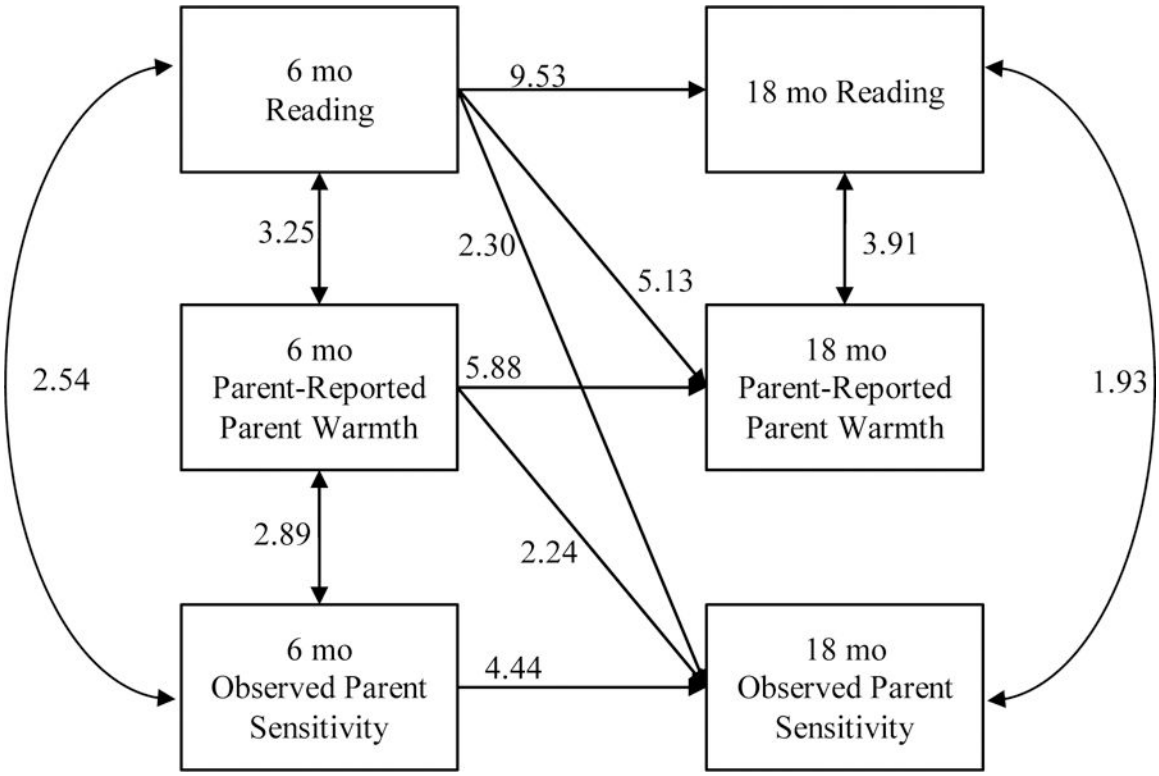


**Figure 1.**

Cross-lagged model predicting 18 month shared book reading and early relational health, reporting unstandardized coefficients. For ease of presentation, covariates and non-significant pathways are not shown.

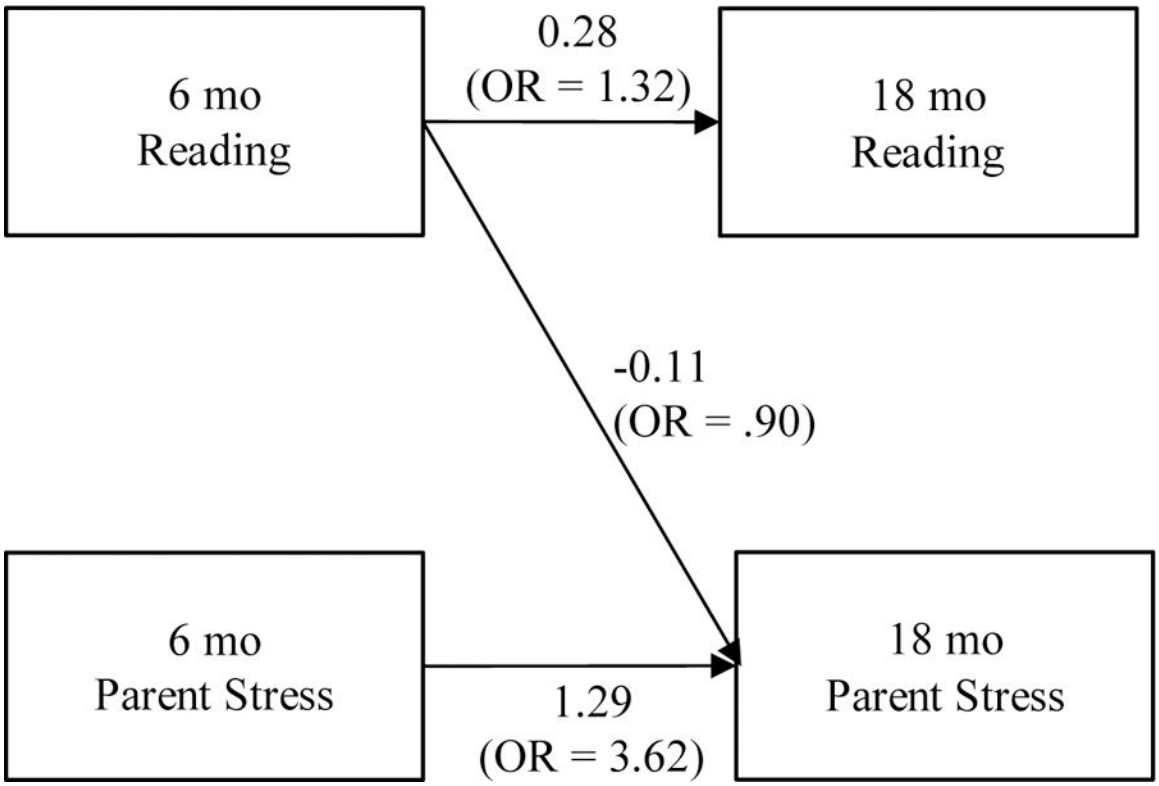


**Figure 2.**

Cross-lagged model predicting 18 month shared book reading and parenting stress, reporting unstandardized coefficients and odds ratios. For ease of presentation, covariates and non-significant pathways are not shown.

**Table 1.**

Sample demographics and descriptive statistics.

| | Full Sample % (n = 303) | NYC % (n = 155) | Pittsburgh % (n = 148) |
|---|---|---|---|
| Parent Married or Living with Partner | 64.1% | 83.5% | 44.0% * |
| Parent Race/Ethnicity | | | |
| Hispanic/Latinx | 45.8% | 87.5% | 2.7% ** |
| Black/African-American | 43.8% | 5.9% | 83.0% ** |
| White | 6.0% | 0.7% | 11.6% ** |
| Other | 4.4% | 5.9% | 2.7% |
| Mother High School Graduate | 70% | 55.6% | 85.1% ** |
| Mother <20 Years at Child's Birth | 5.6% | 2.6% | 8.8% * |
| Income to Need Ratio <1 | 81.8% | 81.9% | 81.8% |
| First Child | 35.7% | 36.8% | 34.5% |
| Female Child | 46.9% | 47.1% | 46.6% |
| | M(SD) | M(SD) | M(SD) |
| 6 mo READ | 6.32(3.49) | 6.03(3.44) | 6.62(3.53) |
| 6 mo READ Quality | 1.60(0.07) | 1.46(0.10) | 1.75(0.09) |
| 6 mo READ Quantity | 3.00(0.15) | 2.98(0.24) | 3.02(0.19) |
| 6 mo Parent-Reported Warmth | 6.69(1.11) | 6.60(0.51) | 6.77(0.35) * |
| 6 mo Observed Sensitivity | 4.02(1.20) | 3.93(1.22) | 4.11(1.17) |
| 6 mo Parenting Stress, at-risk % | 15.8% | 18.0% | 13.5% |
| 18 mo READ | 5.12(3.24) | 5.05(3.26) | 5.17(3.24) |
| 18 mo READ Quality | 2.61(1.28) | 2.57(1.31) | 2.66(1.26) |
| 18 mo READ Quantity | 2.75(2.01) | 2.74(2.01) | 2.77(2.02) |
| 18 mo Parent-Reported Warmth | 6.19(0.81) | 6.02(0.90) | 6.37(0.67) * |
| 18 mo Observed Sensitivity | 4.40(1.01) | 4.43(0.93) | 4.37(1.09) |
| 18 mo Parenting Stress, at-risk % | 22.7% | 28.8% | 16.7% * |

* $p < .05$;

** $p < .01$

**Table 2.**

Correlations between variables at 6 and 18 months.

| | 1. | 1a. | 1b. | 2. | 3. | 4. | 5. | 5a. | 5b. | 6. | 7. | 8. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. 6 mo StimQ READ | -- | | | | | | | | | | | |
| 1a. 6 mo StimQ READ Quality | .76* | -- | | | | | | | | | | |
| 1b. 6 mo StimQ READ Quantity | .81* | .49* | -- | | | | | | | | | |
| 2. 6 mo Parental Warmth | .21* | .20 | .15 | -- | | | | | | | | |
| 3. 6 mo Observed Sensitivity | .19 | .14 | .12 | .19 | -- | | | | | | | |
| 4. 6 mo Parenting Stress | −.27* | −.17 | −.20 | −.37* | −.15 | -- | | | | | | |
| 5. 18 mo StimQ READ | .49* | .35* | .43* | .14 | .13 | −.19 | -- | | | | | |
| 5a. 18 mo StimQ READ Quality | .44* | .32* | .32* | .14 | .16 | −.14 | .88* | -- | | | | |
| 5b. 18 mo StimQ READ Quantity | .42* | .29* | .44* | .09 | .07 | −.19 | .85* | .50* | -- | | | |
| 6. 18 mo Parental Warmth | .35* | .26* | .28* | .38* | .14 | −.35* | .36* | .36* | .25* | -- | | |
| 7. 18 mo Observed Sensitivity | .21 | .15 | .15 | .21 | .30* | −.13 | .21 | .17 | .20 | .21 | -- | |
| 8. 18 mo Parenting Stress | −.24* | −.19 | −.19 | −.29* | −.24* | .55* | −.22* | −.17 | −.22* | −.36* | −.27* | -- |

*p < .05, using Bonferroni correction for multiple comparisons

**Table 3.**

Model fit statistics for models predicting 18 month shared book reading and early relational health.

| | $\chi^2$ (df) | TLI | CFI | RMSEA |
|---|---|---|---|---|
| **Model 1**: baseline stability paths only | 39.48 (9) | 0.61 | 0.87 | 0.11 |
| | $\Delta\chi^2$ ($\Delta$df) | | | |
| **Model 2**: cross-lagged paths from book reading to relational health | 30.22 (2) * | 0.96 | 0.99 | 0.04 |
| **Model 3**: cross-lagged paths from relational health to book reading | 8.96 (4) | 0.41 | 0.89 | 0.14 |
| **Model 4**: fully cross-lagged | 35.61 (6) * | 0.97 | 1.00 | 0.03 |

* $p < .05$

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**Table 4.**

Model fit statistics for models predicting 18 month shared book reading and parenting stress.

| | AIC | BIC |
|---|---|---|
| **Model 1**: baseline stability paths only | 3738.65 | 3797.03 |
| **Model 2**: cross-lagged paths from book reading to parenting stress | 3734.52 | 3796.79 |
| **Model 3**: cross-lagged paths from parental warmth to book reading | 3733.39 | 3795.65 |
| **Model 4**: fully cross-lagged | 3729.26 | 3795.42 |